

# **Work Zone Safety & Mobility in Ohio**

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# Goals of Presentation

**Linking Safety and Congestion**

**Explain why MOT is so Important in Ohio**

**Explain our Processes in the Context of the new Federal Work Zone Regulations**



# Goals of Presentation

## Linking Safety and Congestion

Explain why MOT is so Important in Ohio

Explain our Processes in the Context of the new Federal Work Zone Regulations



# Linking Safety and Congestion

## In Ohio:

- **Interstate - 43% of all Interstate crashes happen on 12% of system.**
- **NON Interstate - 19% of all crashes happen on 2% of the system.**
- **The 12% (IR) and 2% (NON IR) are an almost exact match to the congested locations.**



# Linking Safety and Congestion

- Congestion causes crashes.
- Work Zones can cause congestion.
- Historical WZ crash analysis shows that congested work zones **CAUSE CRASHES.**



# Linking Safety and Congestion

**Much of ODOT's WZ processes revolve around identifying work zone capacity needs and determining constraints to providing that necessary capacity.**



# Goals of Presentation

Linking Safety and Congestion

**Explain why MOT is so Important in Ohio**

Explain our Processes in the Context of the new Federal Work Zone Regulations



# Why MOT is Important in Ohio

**35th in geographical size**

**10th largest highway network**

**5th highest volume of traffic**

**5th highest volume of truck traffic**

**4th largest interstate network**

***2002 (2006?) NCAA Football  
Champions***



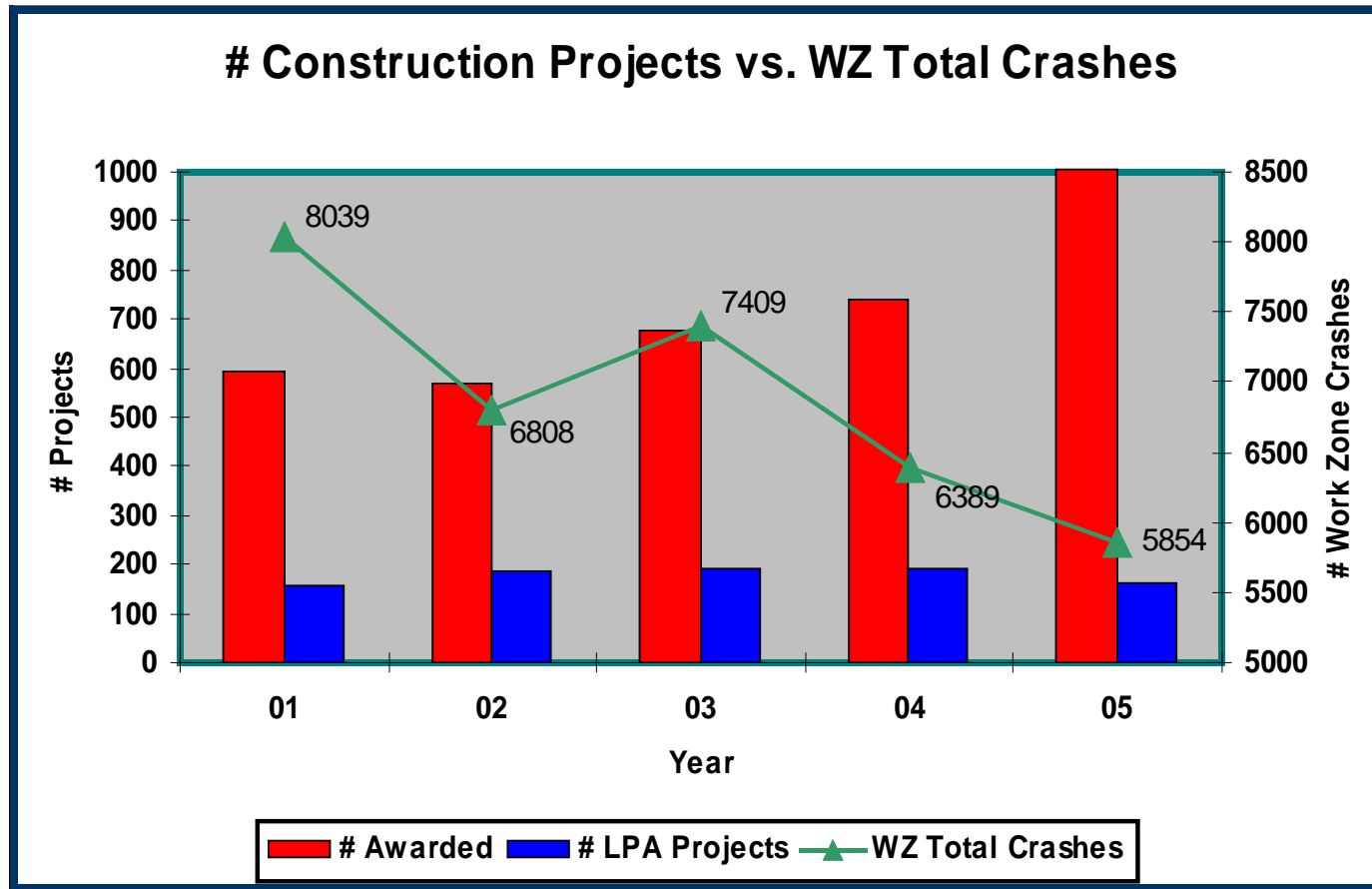
# Why MOT is Important in Ohio

**Need to comply with the new Federal Regulations on Work Zone Safety and Mobility (CFR 630 –Subpart J)**

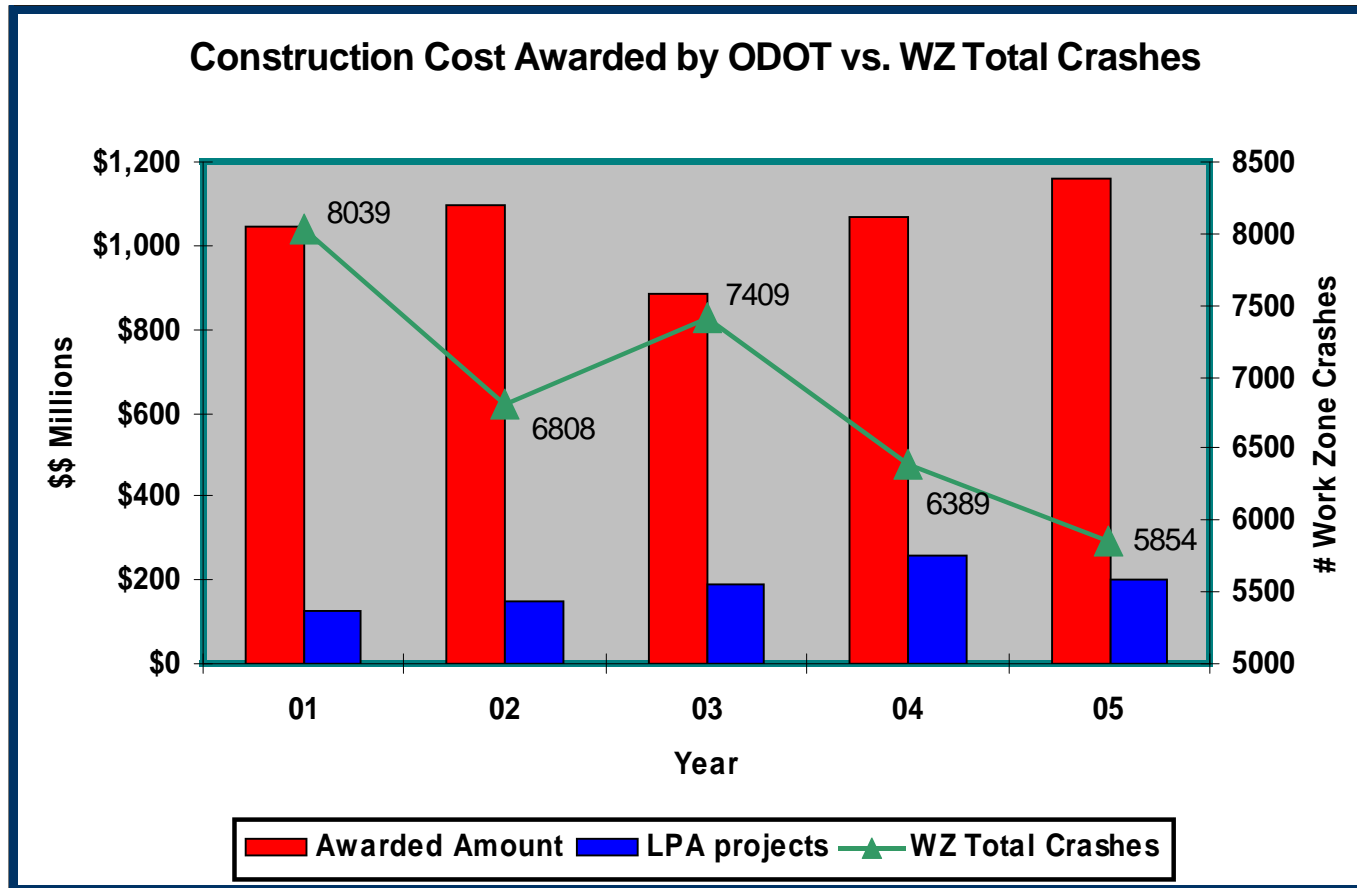
- October 2007 Deadline



# Why MOT is Important in Ohio



# Why MOT is Important in Ohio



# Why MOT is Important in Ohio

**Unlike many other crash types – work zones is one where we can make a substantial positive difference.**



# Why MOT is Important in Ohio

**In addition to mobility, safety, and economic reasons for good work zone processes.....**

**Our Governor got REALLY mad when he was stopped in a work zone!!**



# Goals of Presentation

Linking Safety and Congestion

Explain why MOT is so Important in Ohio

**Explain our Processes in the Context of the new Federal Work Zone Regulations**



# **ODOT's WZ Process in Terms of the New Federal WZ Regulations**

## **Specific ODOT Processes Discussed:**

- MOT Policy**
- MOTAA**
- Historical Crash Analysis**
- Real Time Crash Analysis**
- MOT OPI's**



# **ODOT's WZ Process in Terms of the New Federal WZ Regulations**

## **630.1006 Work Zone Safety and Mobility Policy**

**“SHALL implement a policy for the systematic consideration and management of work zones on all Federal Aid Highway Projects”**

**“SHALL address work zone impacts throughout various stages of the project development”**

### **ODOT**

**“Maintenance of Traffic Policy”**

**“Maintenance of Traffic Alternatives Analysis”**



# **ODOT's WZ Process in Terms of the New Federal WZ Regulations**

## **630.1008 State Level Processes and Procedures**

**Data – “SHALL use field observations, wz crash data, operational information to manage....”**

**Data – “SHALL continually pursue improvement of wz safety and mobility by analyzing work zone crash and operational data from multiple projects.....”**

**ODOT**  
**“Historical WZ Crash Data”;**  
**“Real Time WZ Crash Data”;**  
**“OPI Inspections”**



# **ODOT's WZ Process in Terms of the New Federal WZ Regulations**

## **630.1008 State Level Processes and Procedures**

**Training – “SHALL require that personnel involved in the development, design, implementation .... Be trained”**

### **ODOT**

**“HT Academy” (ODOT personnel);  
“Traffic Academy” (Consultants);  
“Worksite Traffic Supervisor” (Contractor)**



# **ODOT's WZ Process in Terms of the New Federal WZ Regulations**

## **630.1008 State Level Processes and Procedures**

**Process Review – “SHALL perform a process review at least every 2 years”**

**ODOT**

**“Historic Crash Data”**



# **ODOT's WZ Process in Terms of the New Federal WZ Regulations**

## **630.1010 Significant Projects**

**“SHALL identify upcoming projects that are Expected to be significant”**

**ODOT**

**“Maintenance of Traffic Alternative Analysis”;  
“Maintenance of Traffic Policy”**



# **ODOT's WZ Process in Terms of the New Federal WZ Regulations**

## **630.1010 Significant Projects**

**“All IR projects within TMA with lane closures lasting more than 3 days SHALL be considered significant”**

### **ODOT**

**The MOT Policy defines when lane closures can happen on ALL IR segments. Our lane closure threshold is ONE day (in an emergency) without regard to it being urban or rural.**



# **ODOT's WZ Process in Terms of the New Federal WZ Regulations**

## **630.1012 Project Level Procedures**

**TMP – “SHALL develop a TMP that consists of a Temporary Traffic Control (TTC) plan and Addresses both Transportation Operations (TO) and Public Information (PI)”**

### **ODOT**

**TMP is commensurate with impacts determined by Maintenance of Traffic Alternative Analysis (MOTAA). PI requirements are part of MOT Policy.**



# ODOT's WZ Process in Terms of the New Federal WZ Regulations

More on TMP's **(TMP TANGENT)**

**The ODOT Philosophy**

**The goal of the MOTAA is to identify workzone problems before detailed design.**

**Engineer a solution into the detailed design**



# ODOT's WZ Process in Terms of the New Federal WZ Regulations

## More on TMP's (TMP TANGENT)

**When engineering fix isn't possible/practical-use innovative contracting and innovative construction techniques to minimize duration of the problem (sub-phases).**

**Extensive TMP's are not usually required (only an MOT Plan is required) when the impacts are identified early and designed out of the project.**



# **ODOT's WZ Process in Terms of the New Federal WZ Regulations**

## **More on TMP's**

### **Past examples of TMP's include:**

- Web Cams w/dedicated work zone info web pages (common)
- Pay for increased bus service (very,very rare)
- ITS (occasionally when needed)
- Ramp closures to constrain traffic in work zone (occasional)



# **ODOT's WZ Process in Terms of the New Federal WZ Regulations**

## **More on TMP's**

### **Past examples of TMP's include:**

- Ban commercial trucks (infrequent)
- Alternate route improvements (especially signal operations)
- Moveable barrier (once – about to do our 2nd)

**WE ALWAYS HAVE A PUBLIC INFORMATION EFFORT – Scaled to expected project impacts**



# **ODOT's WZ Process in Terms of the New Federal WZ Regulations**

## **THE MOT POLICY**

- **630.1006 Work Zone Safety and Mobility Policy**
- **630.1010 Significant Projects**



# ODOT's WZ Process in Terms of the New Federal WZ Regulations

## The MOT Policy – What does it do?

- Real purpose is to systematically determine and provide required **work zone capacity** for IR work zones.

## The MOT Policy – When does it happen?

- In Preliminary Engineering – **before** detailed plans are created



Construct  
Project

Step 14

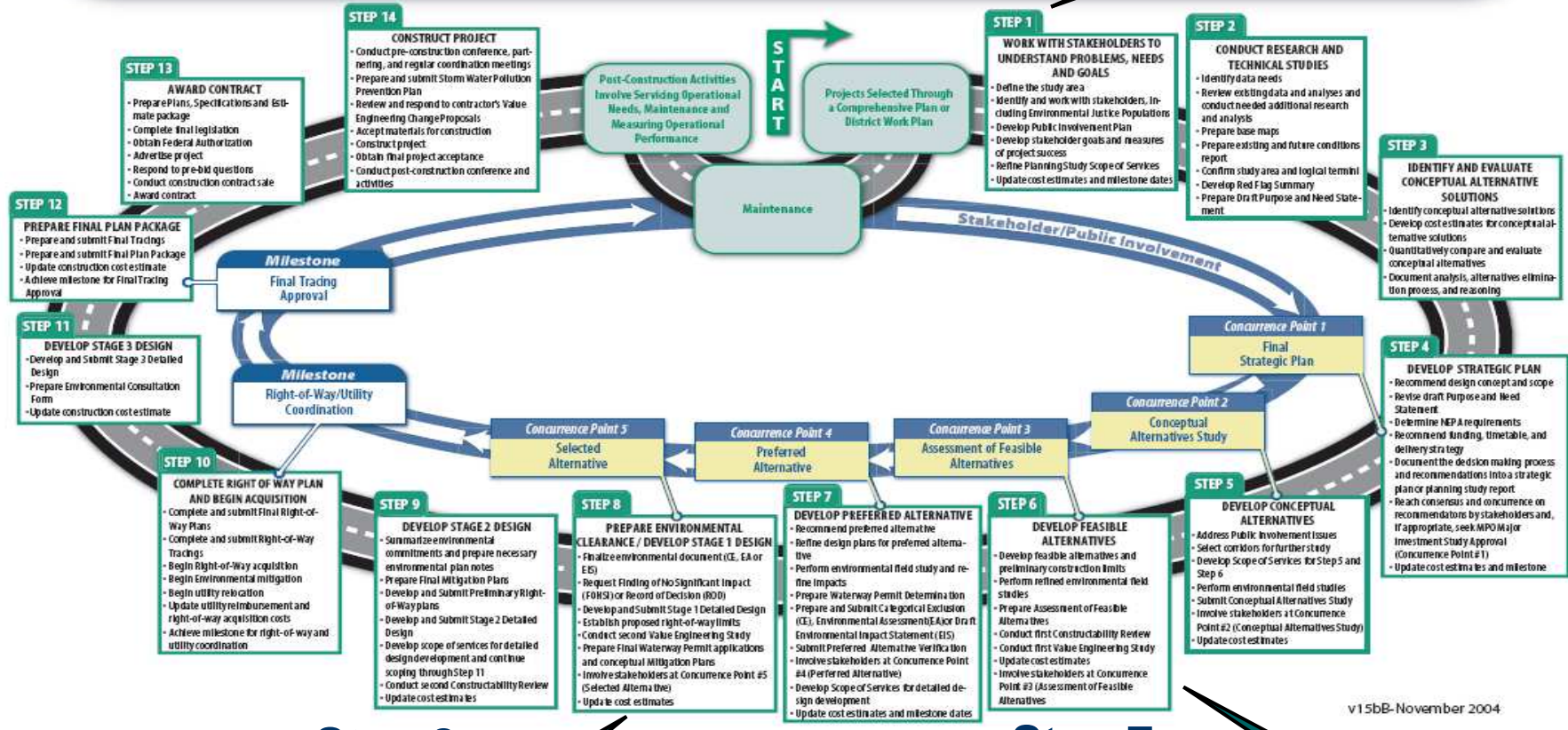
# The MOT Policy

Step 1

Start  
Project

Ohio Department of Transportation

## Project Development Process (PDP) for Major Projects



Step 8

Stage 1  
Design

Step 7

MOT Policy  
Exception  
Requests

Step 6

MOTAA

# The MOT Policy – Major Policy Elements

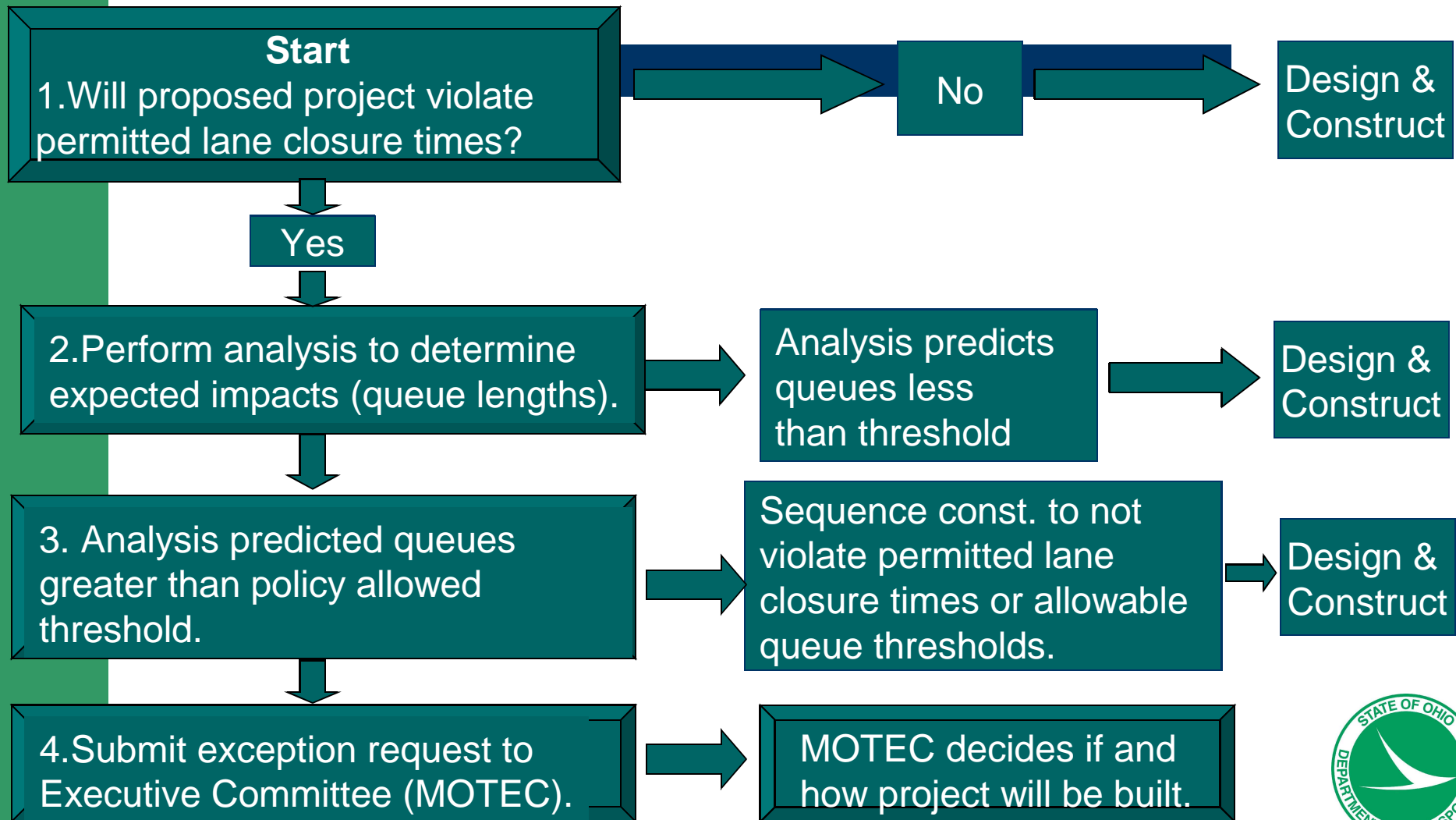
## Permitted Lane Closure Map (Times)

Pre-defined times when any section of the IR or look alike system can have the number of lanes reduced based upon work zone capacity (volumes, % of trucks, terrain type)

## Maximum allowable queue thresholds



# The MOT Policy – Major Policy Elements



# 1. Will proposed project violate permitted lane closure times?

Permitted Lane Closure Map - Microsoft Internet Explorer

Address: [http://dotaw201/plcm/plcm\\_web%20search.jsp](http://dotaw201/plcm/plcm_web%20search.jsp)

Permitted Lane Closure

Search

Year: 2003 District: [Dropdown] County: [Dropdown] Route: [Dropdown] Section: [Dropdown] Begin Log: [Text] End Log: [Text]

Go Clear

For any Maintenance lane(s) closure or any Construction project lane(s) closure, outside of plan note times, a Lane Closure Application request form must be submitted to the Work Zone Traffic Manager and the Highway Management Administrator for approval. In addition a copy of the request form must be submitted to the Roadway Services Manager for ODOT maintenance work or to the Construction Engineer for construction projects. The request must be submitted, in writing, three(3) working days in advance of the lane(s) closure. No lane closures will be permitted during Holidays or Special Events, see Special Events / Holiday note. Traffic flow must be monitored and lanes re-opened if any backup begins to occur.

ODOT Permitted Lane Closure

District: 6 County: FRA Route: IR-270 DIR: BOTH Calculation Year: 2003 Section: US33 (Dublin) to Sawmill Rd

Calculation Method: D ADT using statewide distribution ATR: 0 Seasonal Adjustment: 0

BEGIN LOG: 17.250 Road Class: URBAN (Urban or Rural) ADT Year: 2001

END LOG: 19.830 Terrain: ROLLING Percent Trucks: 12 ADT: 118639 88712 Construction: 109411 84888 Non-Construction

Lanes per direction: 3 Annualized ADT: 98470 Capacity: 1310 per lane

There shall be no lane closures on Holidays or Holiday weekends. The following are considered holidays: Memorial Day, Fourth of July, Labor Day, Thanksgiving, Christmas, New Years, Easter. No lane closures are allowed after 12 noon on the day preceding a holiday. For holiday weekends no lane closures are allowed after 12 noon on the day preceding the Holiday weekend until 6 am the day after the holiday weekend. Ex: Holiday falls on a Monday then no lane closures from 12 noon on Friday until 6 am Tuesday.

Hour of the Day	Ratio of Lanes 3:2		Traffic Volume per open lane	
	Construction Weekday	Non-Const. Weekday	Construction Weekday	Non-Const. Weekday
0-1AM	297	222	274	212
1-2AM	208	155	191	149
2-3AM	178	133	164	127
3-4AM	208	155	191	149
4-5AM	267	200	246	191
5-6AM	653	488	602	467
6-7AM	*1513	*1131	*1395	*1082
7-8AM	*2195	*1641	*2024	*1570
8-9AM	*1780	*1331	*1641	*1273
9-10AM	*1394	1042	1286	997
10-11AM	1246	891	1149	881
11-12PM	*1894	1042	1286	997
12-1PM	*1424	1065	*1313	1019
1-2PM	*1542	1153	*1422	1104
2-3PM	*1780	*1331	*1641	*1273
3-4PM	*2165	*1619	*1997	*1549
4-5PM	*2432	*1819	*2243	*1740
5-6PM	*2580	*1929	*2380	*1846
6-7PM	*1869	*1397	*1723	*1337
7-8PM	1275	954	1176	913
8-9PM	1028	754	930	722
9-10PM	949	710	875	679
10-11PM	741	554	684	531
11-12AM	564	421	520	403

Legend: [Red Box] = Lane Closure(s) Not Permitted

3:2 Ratio Of Lanes  
3 Available Lanes  
2 Lanes Open

Season: Construction April 1 - Nov 30  
Non Construction Dec 1 - March 31

Last Updated: 10/31/03 1:32 PM

Hour of the Day	Ratio of Lanes 3:1		Traffic Volume per open lane	
	Construction Weekday	Non-Const. Weekday	Construction Weekday	Non-Const. Weekday
0-1AM	593	444	547	424
1-2AM	415	310	383	297
2-3AM	356	266	328	255
3-4AM	415	310	383	297
4-5AM	534	399	492	382
5-6AM	1305	976	1204	934
6-7AM	*3025	*2262	*2790	*2165
7-8AM	*4390	*3282	*4048	*3141
8-9AM	*3559	*2661	*3282	*2547
9-10AM	*2788	*2085	*2571	*1995
10-11AM	*2491	*1863	*2298	*1783
11-12PM	*2788	*2085	*2571	*1995
12-1PM	*2847	*2129	*2626	*2037
1-2PM	*3885	*2907	*2845	*2207
2-3PM	*3559	*2661	*3282	*2547
3-4PM	*4330	*3238	*3994	*3098
4-5PM	*4864	*3637	*4486	*3488
5-6PM	*5161	*3859	*4759	*3693
6-7PM	*3737	*2794	*3446	*2674
7-8PM	*2551	*1907	*2352	*1825
8-9PM	*2017	*1508	*1868	*1443
9-10PM	*1898	*1419	*1751	*1358
10-11PM	*1483	1109	*1368	1061
11-12AM	1127	843	1039	806

Home Search



2. Perform analysis to determine expected impacts (queue lengths).

- **Use QUEWZ-98 program to calculate the capacity of a work zone option**
- **Apply adjustment factors in calculation process based on ODOT research.**
- **Apply these capacity volumes and the traffic data to the ODOT developed queue calculation spreadsheet**



3. Analysis predicted queues greater than policy allowed threshold..

## **Allowable queue thresholds**

- Queues less than 0.75 miles are acceptable
- Queues greater than 0.75 miles and less than 1.5 miles if the queue exceeds 0.75 for two hours or less
- 0.75 mile queues with a duration greater than 2 hours or longer than 1.5 miles are unacceptable



4. Submit exception request to  
Maintenance of Traffic Exception  
Committee (MOTEC)

## **MOTEC compromised of Executive Management because of fiscal implications**

### **Exception requests include the following information for multiple alternatives:**

- Queue lengths, queue durations, construction costs, construction schedules and mitigation strategies



# Mitigation Strategies

## Can Include:

- ITS, web cams, incident response, extensive detour planning, extensive public information campaigns, innovative contracting techniques, ramp closures

**Bottom line – Very few exceptions granted**



# **ODOT's WZ Process in Terms of the New Federal WZ Regulations**

## **Maintenance of Traffic Alternative Analysis (MOTAA)**

**Don't get confused – this is NOT the MOT Policy!**

- **630.1006 Work Zone Safety and Mobility Policy**
- **630.1010 Significant Projects**



# The MOTAA

## The MOTAA – What does it do?

- Identifies work zone problems (constraints) early enough in the project development process so that you have time to do something about them.
- By necessity, happens early enough so that constraint fixes can be incorporated into the environmental, R/W, pavement selection and bridge structure scoping processes.
- Safety, mobility, constructability and access issues explicitly studied.

When is the key



# The MOTAA

## **MOTAA “Deliverables”**

- Decides scope: X-over; Part Width; Hybrid; Full Closure
- Highlights problems in time for fixes to be engineered into the subsequent design.
- Factored into which project alternative gets selected
- Highlights need for innovative contracting & construction techniques.
- Highlights constructability issues.

**DON'T PICK AN ALTERNATIVE WHERE YOU CAN'T MAINTAIN TRAFFIC!!**



# The MOTAA

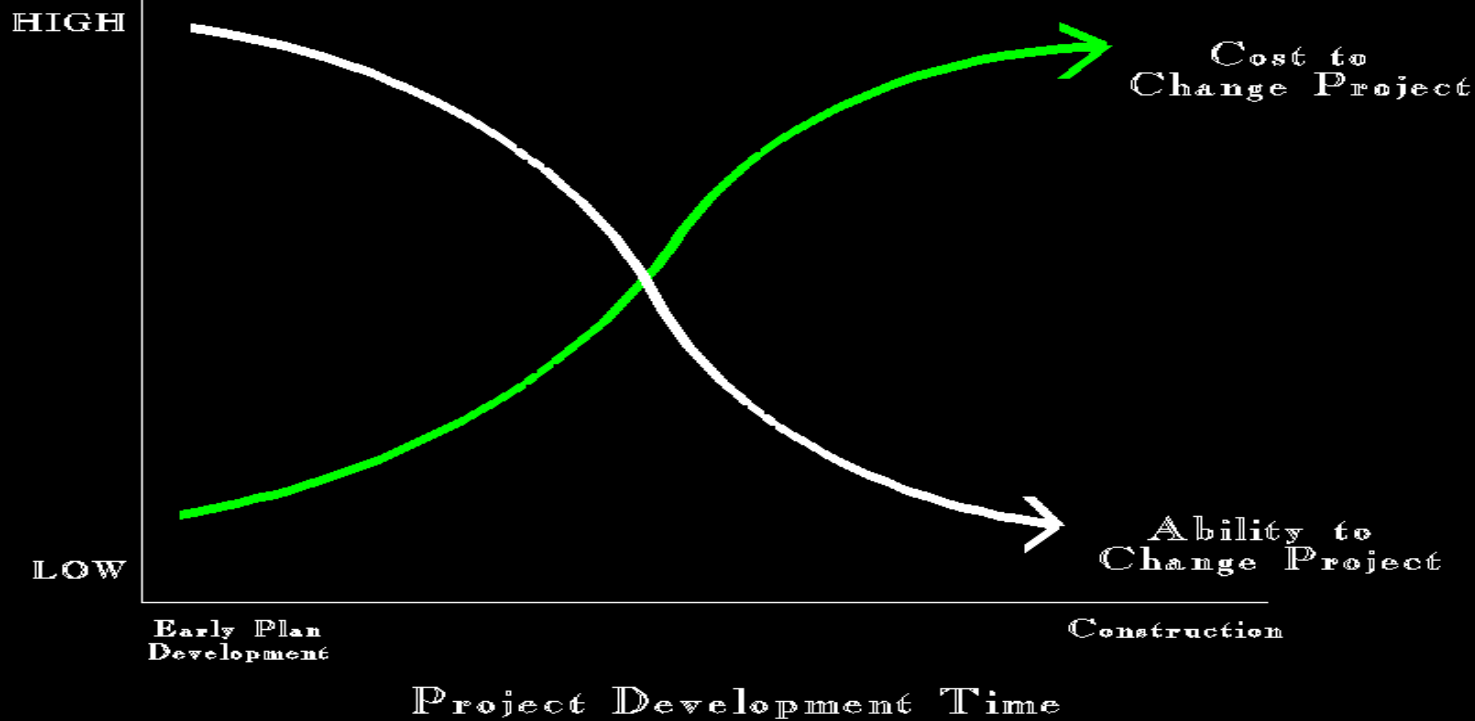
**MOST IMPORTANT PART** – The format of the analysis isn't as important as **WHEN** it happens. Formalizing in the plan development process was key.

**Identify the impacts early** enough in the project development process in order to make the changes necessary (R/W, Environmental, Pavement Selection, Bridge Design)



# Cost to make change “VS” Ability to make change

## MAKING PLAN CHANGES FOR MOT



# The MOTAA

- Designer is given a specific “desired” foot print (cross section) and then reports on a given list of potential problems
- The number of lanes are based on the PLC (Work Zone Policy)
- “Desired” foot print (cross section) is overlaid at defined location for both a crossover and part width alternatives.



## Designer reports (for both cross over and part-width) if any of the following problems would be expected:

Work Zone policy  
Maintain access (off-ramp capacity)  
Ramp merges  
Environmental impacts  
Construction cost/duration  
Maintenance of existing lighting/drainage  
Construction joint location (concrete)

Crossover location  
R/W impacts  
Bridge widths  
Earthwork, retaining walls, profiles  
Constructability/ Constr. Access  
Provide “desirable” “footprint/cross section”

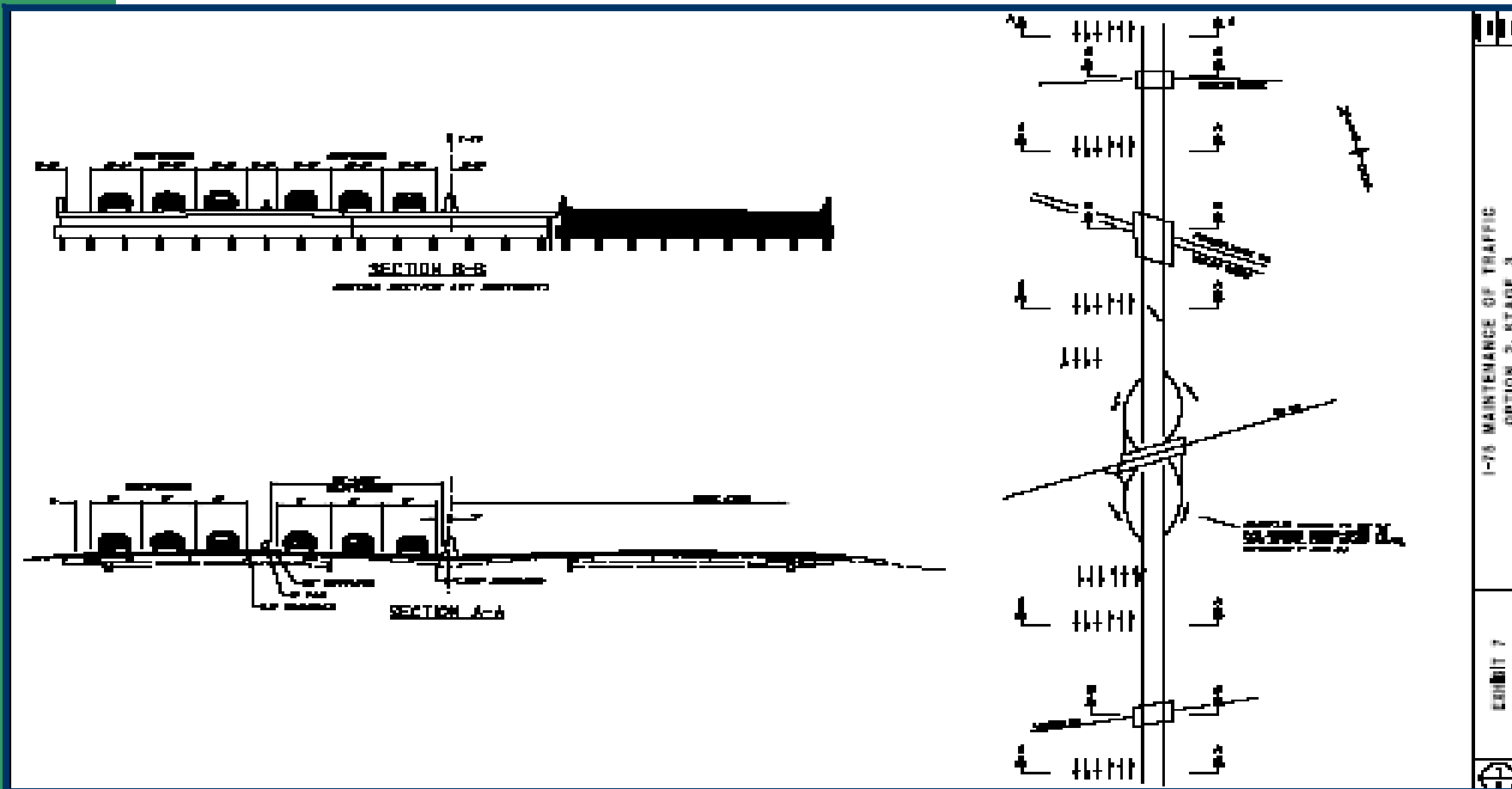


# The MOTAA

Table 1 – Comparison of Feasible Alternatives – I-75 Construction

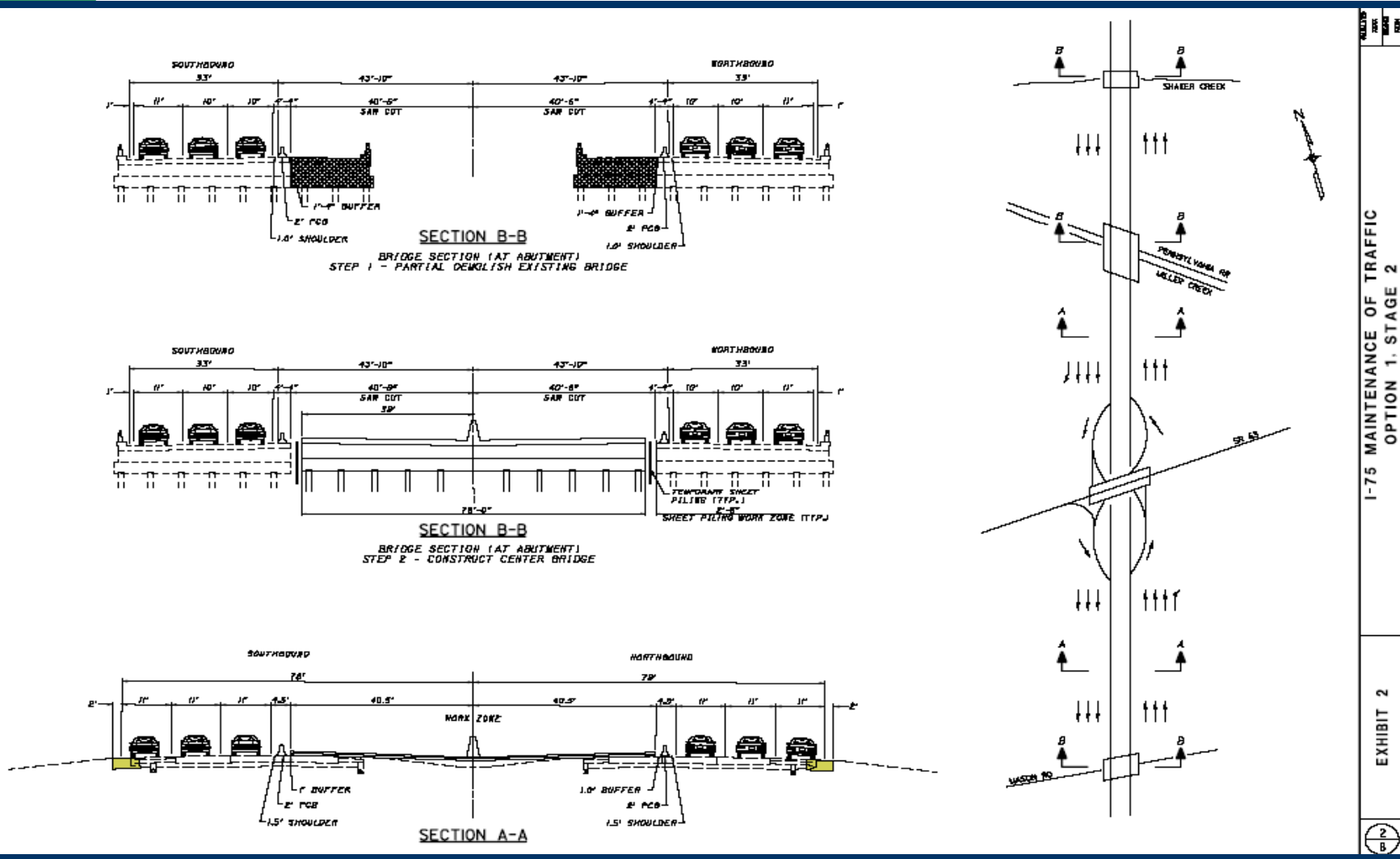
Factor to be Considered	Option	
	1	2
	Part-Width Construction (with partial demolition at bridges)	X-over Construction (without partial demolition at bridges)
Ability to Meet Work Zone Policy	Full closure of I-75 may be required at night, during partial demolition of the structures.	Meets policy at all times.
Ability to maintain all accesses	Simple access provided, utilizing two-step construction.	Access to SR 63 will be provided using crossovers in Stage 3.
Ability to provide on-ramp Decision Sight Distances	Meets TEM requirements.	Meets TEM requirements. See strip maps, Exhibits A through G.
Right-of-way and environmental impacts	MOT scheme would not increase R/W or environmental impacts along I-75. Additional (minor) temporary easements are anticipated along SR 63, to facilitate placement of temporary pavement for part-width construction.	MOT scheme would not increase R/W or environmental impacts along I-75. Additional (minor) temporary easements are anticipated along SR 63, to facilitate placement of temporary pavement for part-width construction.
Final bridge widths	MOT scheme does not impact proposed final bridge widths (approx. 78.5' face-to-face of barrier in both directions on I-75).	MOT scheme does not impact proposed final bridge widths (approx. 78.5' face-to-face of barrier in both directions on I-75).

# The MOTAA



## Cross-Over

# The MOTAA



I-75 MAINTENANCE OF TRAFFIC  
 OPTION 1, STAGE 2  
 EXHIBIT 2  
 2  
 3

# The MOTAA – Success Stories

**I-90 Downtown Cleveland – Alternative Selection**

**(Don't build alternatives that can't maintain traffic!!)**

**I-70 Downtown Columbus – Alternative Selection**

**I-75 Cincinnati – Changing R/W saved \$10M**

**US-23 Corridor – Showed need for Temporary R/W from  
Vatican (yes – that the Vatican)**

**I-75 Downtown Dayton – Numerous unavoidable pinch  
points; innovative contracting to lessen duration**

**Countless projects that effected bridge design, R/W and  
environmental document.**



# **ODOT's WZ Process in Terms of the New Federal WZ Regulations**

## **Historical WZ Crash Data**

### **630.1008 State Level Processes and Procedures**

- “Shall use field observations, wz crash data....”
- “Shall continually pursue improvement of wz safety and mobility by analyzing work zone crash and operational data from multiple projects....”



# Historical WZ Crash Data

## Why did we do the analysis?

- ODOT is embarking on the largest construction program(s) in our history
- Director was concerned about the impact our work zones will have on crashes

**Question - Are the ODOT work zones causing more accidents? - If so, can we do more to limit the increase?**



# Historical WZ Crash Data

## THE KNEE JERK REACTION

- “Well of course we have more crashes in work zones. Narrow lanes, barriers next to lanes, and on... and on.... and on....”
- Historical crash data analysis showed there were things we could do better!!



# Historical Crash Analysis 2003

Work Zone Crash Summary - 2003

County	Route	Project	Begin SLM	End SLM	Length	Begin Month	End Month	Time Period (Days)	2003 Average ADT	Work Zone Crashes	Work Zone Rate	Work Zone Cost	Fatal	Injury	PDO
HAM	0275	32(02)	28.08	32.20	4.12	1	12	348	114,985	429	2.60	\$5,500,494	0	83	346
CLE	275	2(02)	4.29	9.79	5.50	1	10	287	69,120	155	1.42	\$3,034,793	1	32	122
		172(02)	9.79	13.58	3.79	1	12	358	59,890	255	3.14	\$4,633,355	1	61	193
BUT	0075	420(02)	0.00	6.41	6.41	03	12	289	135,463	415	1.65	\$6,721,326	0	107	389
HAM	0075	420(02)	15.27	17.40	2.13	03	12	289	140,495	162	1.87	\$2,762,640	0	40	184
STA	0077	3008(00)	11.59	12.76	1.17	01	04	127	86,022	37	2.89	\$338,094	0	3	34
		467(02)	12.76	14.81	2.05	05	10	180	87,148	79	2.46	\$1,233,036	0	22	57
CUY	0480	485(02)	12.61	15.97	3.36	03	9	208	158,802	157	1.41	\$2,394,036	0	42	115
MOT	0075	560(01)	18.20	19.79	1.59	01	12	365	98,970	50	0.87	\$815,670	0	15	35
		100(03)	19.79	21.41	1.62	03	12	289	94,161	123	2.79	\$1,878,714	0	33	90
MED	0071	239(00)	20.40	21.40	1	01	04	122	37,965	12	2.60	\$208,872	0	4	8
		239(00)	23.52	24.52	1	03	07	152	48,663	9	1.22	\$91,098	0	1	8
RIC	0071	116(01)	18.90	20.40	1.5	04	11	243	40,640	20	1.35	\$1,242,209	1	4	15
								3,257		AVE.	2.02	\$30,854,337	Ave. Cost / Day \$9,473		

Free Flow Comparable

Comp. Crashes	Comp Year	Comp Year ADT	Comp. Rate	Percent Difference	Free Flow Cost	Fatal	Injury	PDO	Cost Difference	Hot Spot	Congested	HSP - I	HSP - NI
259	00	109,353	1.65	58%	#####	0	48	211	#####	Y	19	52	124
106	00	78,100	0.86	65%	#####	0	33	73	#####	Y	242	336	348
115	00	60,990	1.39	126%	#####	1	24	90	#####				
312	02	129,109	1.30	27%	#####	0	51	261	#####	Y	90	168	11
135	02	135,303	1.62	16%	#####	0	27	108	#####				
22	99	82,379	1.80	61%	\$339,228	0	6	16	-\$1,134	Y	96	--	187
25	99	81,604	0.83	196%	#####	1	8	16	-\$172,685				
101	02	153,809	0.94	51%	#####	0	27	74	\$854,550	Y	212	328	143
48	02	98,670	0.84	4%	\$802,710	0	15	33	\$12,960	Y	40	507	133
71	02	92,077	1.65	69%	#####	0	24	47	\$631,962				
5	99	40,965	1.00	159%	\$97,956	0	2	3	\$110,916	N	--	607	424
8	99	53,250	0.99	23%	\$117,396	0	2	6	-\$26,298	--	--	--	--
10	00	42,380	0.65	109%	\$195,912	0	4	6	#####	N	--	--	--
									Ave.				
		AVE.	1.19										

WZ Crash Rate=2.02

NON WZ Crash Rate = 1.19



# Historical Crash Analysis

## **Drilled deeper into data:**

- Logged and analyzed hundreds of work zone crashes
- Looked for “abnormally” high concentration of crashes.
- Analysis showed need for new/revised specifications & processes



# Historical Crash Analysis

## Results :

**Geometrics - The “abnormally” high concentrations of crashes showed there were major geometric contributing factors to Ohio’s work zone crashes:**

- (a) Inadequate ramp merges
- (b) Inadequate off-ramp capacity
- (c) Insufficient paved shoulders



# Historical Crash Analysis

Ramp Merges – Created new standards for work zone on-ramp merges. Merges are now required to be detailed in plans. (now explicitly looked at in MOTAA)

Paved shoulders – Created “desired/minimum” cross section that requires a 2’ paved shoulder (now used in MOTAA and detailed design)

Off-Ramp-Capacity – Now explicitly looked for in Maintenance of Traffic Alternative Analysis (MOTAA).



# Historical Crash Analysis

**Hot off the presses – 2006 Historical Data Analysis has started.....**

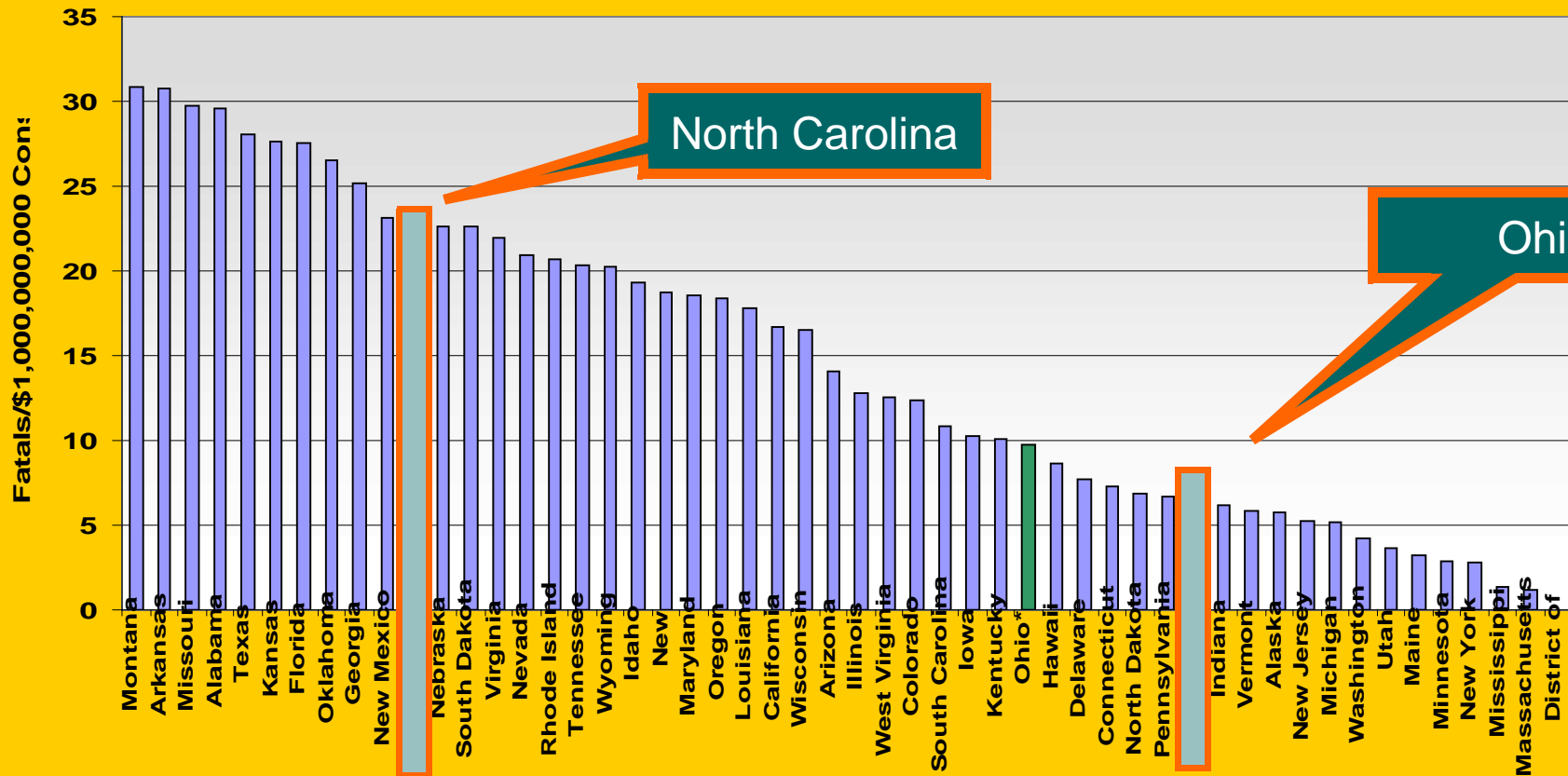
**Emphasis on Fatalities and Fatal Crashes.....**

**Preliminary Information follows.....**



# Historical Crash Analysis

**State Comparison of Work Zone Fatalities Per \$1 B Construction**  
(Fatalities As Reported by 2004 FARS)



Ohio\* = FARS Data

Ohio\*\* = Actual Ohio Data



# Historical Crash Analysis

2000 - 2005 Work Zone Fatal Crashes

Year	Total Number		Dui	Seatbelt Used	Interstate	US/SR	Other Route	motorcycle	Stopped Traffic	Not staying in Correct Lane	Not dry pavement	Night
2005	20		2	6	11	6	3	2	5	8	4	7
			10%	30%	55%	30%	15%	10%	25%	40%	20%	35%
2004	14		1	4	7	5	2	1	2	2	2	8
			7%	29%	50%	36%	14%	7%	14%	14%	14%	57%
2003	14		1	2	10	3	1	1	3	6	1	1
			7%	14%	71%	21%	7%	7%	21%	43%	7%	7%
2002	26		6	10	10	12	4	1	2	10	4	11
			23%	38%	38%	46%	15%	4%	8%	38%	15%	42%
2001	20		2	3	14	1	5	3	4	5	2	7
			10%	15%	70%	5%	25%	15%	20%	25%	10%	35%
2000	16		4	3	8	4	4	0	1	5	1	4
			25%	19%	50%	25%	25%	0%	6%	31%	6%	25%
Total:	110		16	28	60	31	19	8	17	36	14	38
			15%	25%	55%	28%	17%	7%	15%	33%	13%	35%

New Emphasis Areas??



# Historical Crash Analysis

**Of the total 110 fatal WZ crashes; 22 involved pedestrians as the victim (20%).**

**Of the total 110 fatal WZ crashes; 27 involved construction workers or equipment (25%).**



# Historical Crash Analysis

**17 (15%) of the fatal crashes were rear ends  
11 of 17 were on Interstate routes.**

**We're not supposed to have backups in IR Work Zones ?!?!?!?**

- 3 of 17 during AM peak hours
- 3 of 17 occurred during the PM peak hours
- 6 of 17 occurred at night (9:30 to 12 PM)

**??? What the heck were we doing at this time of night???**

- 2 of 17 occurred midday



# Historical Crash Analysis

## Work Zone (Non Work Zone) Fatal Crash Statistics

Interstate Fatal Crashes	2001	2002	2003	2004	2005		AVE
2. % of fatal crashes that are fixed object;	14% (40%)	0% (43%)	10% (42%)	29% (41%)	46% (39%)		20% (41%)
3. % of fatal crashes that are angle	14% (16%)	30% (10%)	10% (20%)	0% (11%)	0% (15%)		11% (14%)
4. % of fatal crashes that are pedestrian	21% (8%)	20% (6%)	50% (7%)	0% (9%)	18% (9%)		16% (8%)
7. % of fatal crashes that are drug and alcohol	7% (33%)	10% (18%)	10% (51%)	0% (33%)	9% (38%)		7% (35%)
8. % of fatal crashes that are night time	43% (44%)	60% (46%)	10% (54%)	57% (49%)	46% (42%)		43% (47%)

Problems?

# Real Time WZ Crash Data (as opposed to historic)

## 630.1008 State Level Processes and Procedures

- “Shall use field observations, wz crash data....”
- “Shall continually pursue improvement of wz safety and mobility by analyzing work zone crash and operational data from multiple projects....”



# Real-Time Crash Analysis

Candidate projects identified in winter.

Coordinate w/local enforcement to have WZ crashes put aside for pickup twice/month.

**PHYSICALLY PICKING UP CRASH REPORTS  
IS THE ONLY METHOD THAT HAS WORKED.**

Database application automatically sorts crashes into ½ mile segments (geo – locate).

Compared to historical “non-construction” frequencies.

“Problem” locations investigated.



# Real-Time Crash Analysis

## WARNING

-This slide targeted to the computer enthusiasts

- Data input into Access data base through data entry form.
- Crash trends are sorted and analyzed using pivot tables/charts.
- Individual queries created for each wz in access data base file.
- Excel (using visual basic coding) hits data base file and runs queries to refresh charts and graphs with latest data.



# Real-Time Crash Analysis

**System is set up by start of construction season.**

**Once Set-up, the ONLY thing needed done is to input new crash data.**

- ALL CHARTS, GRAPHS, & DATA ARE GENERATED AUTOMATICALLY WITH THE PUSH OF A BUTTON – VERY COOL .....**



# Real-Time Crash Analysis

## Main Screen

**Work Zone Crash Report Database Switchboard**

Click Button to Load Form to Enter or Modify Crash Report Data

Click Button to Run the Work Zone Crash Summary Report by County and Route

Click Button to Run the Work Zone Crash Detail Report by County, Route, Log, Rpt #

Run RIC-71 Work Zone Crash Summary

Run MED-71 Work Zone Crash Summary

Run FRA-270 NEXT Work Zone Crash Summary

Run FRA-161 NEXT Work Zone Crash Summary

Run MOT-70 Work Zone Crash Summary

Run MOT-75 Work Zone Crash Summary

Run LUC-280 Work Zone Crash Summary

Run HAM-74 Work Zone Crash Summary

Run CUY-71 Work Zone Crash Summary

Run CUY-90 Work Zone Crash Summary

Run ATB-90 Work Zone Crash Summary

Run STA-77 9.50 Work Zone Crash Summary

Run STA-77 14.8 Work Zone Crash Summary

Run SUM-77 Work Zone Crash Summary

Run FAY-71 Work Zone Crash Summary

Run MAD-70 Work Zone Crash Summary

Run CLA-70 Work Zone Crash Summary

Run FRA-270 SW Work Zone Crash Summary

Run HAM-275 Work Zone Crash Summary

Run CLE-275 Work Zone Crash Summary

Run ALL-30 Work Zone Crash Summary

Run SAN-53 Work Zone Crash Summary

Run SAN-53 Work Zone Crash Summary

Launch Excel Work Zone Spreadsheet

Record: 1 of 1

Form View

start Dave Holstein - Inbox... Microsoft PowerPoint... O:\TRAFFIC\WorkZo... Traffic Database : Da... frm\_Switchboard : Form

3:34 PM Tuesday 7/15/2008



# Real-Time Crash Analysis

## Crash Report Data Entry Form

Work Zone Database Entry Form

Crash Report Data Entry Form

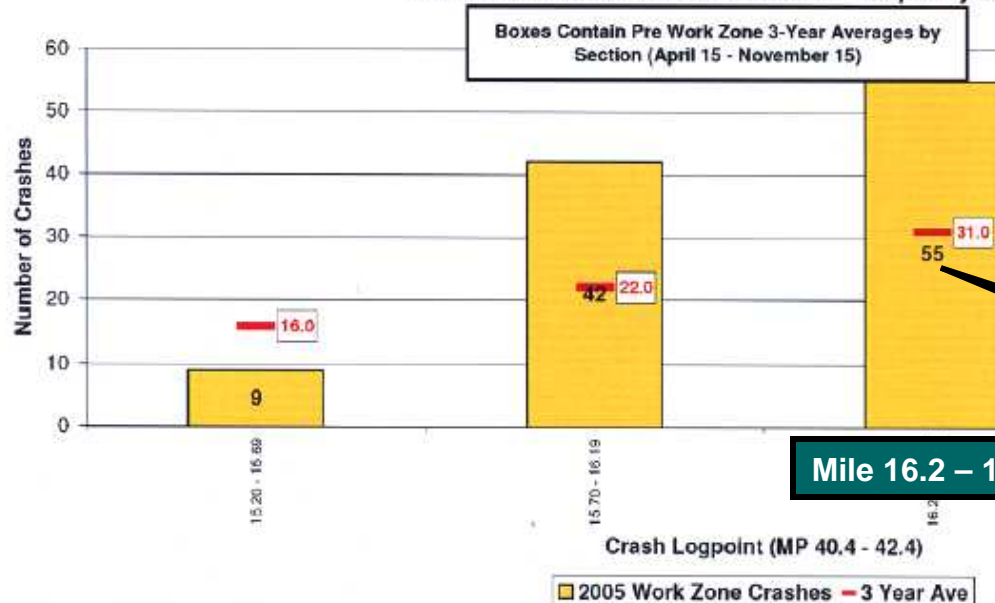
LOCAL REPORT	04-0163-09	ROUTE TYPE	IR	ROUTE NUMBER	75	ROAD CONDITION	ROAD - DRY
SEVERITY	FATAL	STREET2_REFERENCE:	MILEPOST 23	CRASH TYPE	OTHER NON COLLISION		
COUNTY	BUT	YEAR	2005	LIGHT CONDITIONS	DARK - LIGHTED		
CRASH DATE (MM/DD/YY)	04/26/05	LOG	5.23	WORKZONE TYPE			
HOUR	0	VEHICLE TYPE 1:	38	WORKZONE LOCATION			
DAY	TUESDAY	VEHICLE TYPE 2:	2	PROJECT NUMBER			
		CONTRIBUTING FACTOR	IMPROPER CROSSING				
		DIRECTION OF TRAVEL	WEST				
		LOCATION	NON - INTERSECTION				
				Date Entered:	05/23/05		

If any unit is type 9-17, enter as one of the two units

# Real-Time Crash Analysis

## Application Outputs

FRA-SR-161 Work Zone Crash Location-Frequency Chart

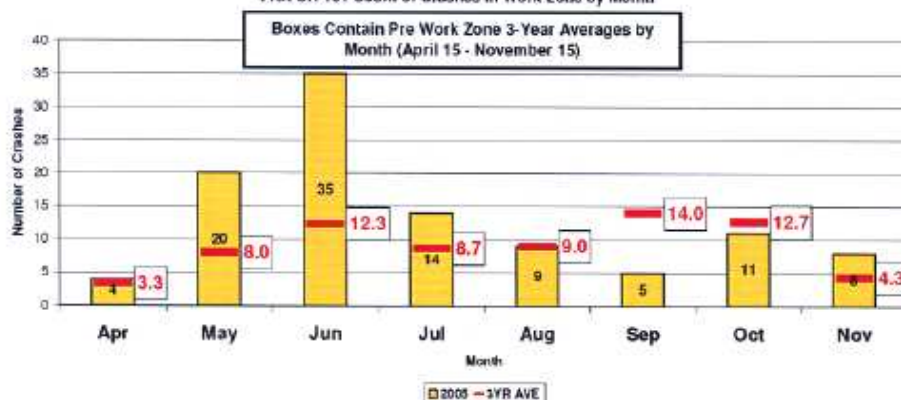


Non WZ Avg #  
of Crashes = 31  
(7 months)

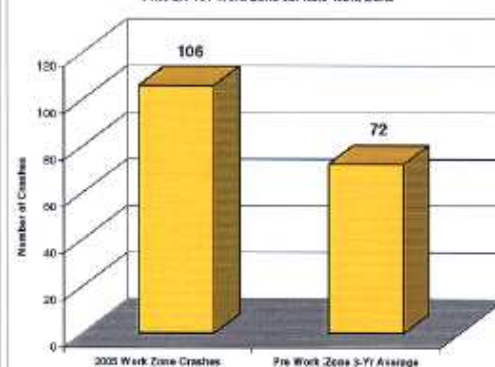
Mile 16.2 - 16.99

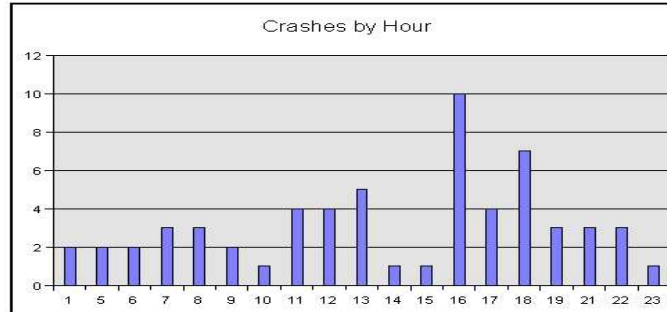
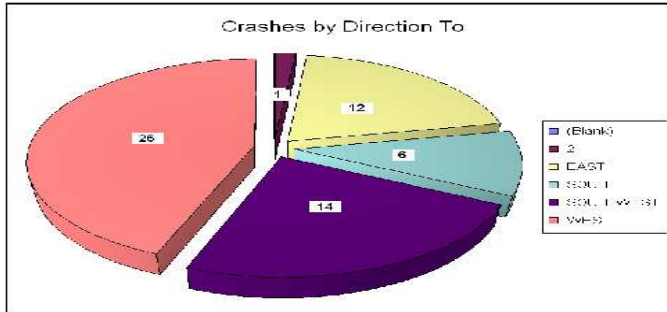
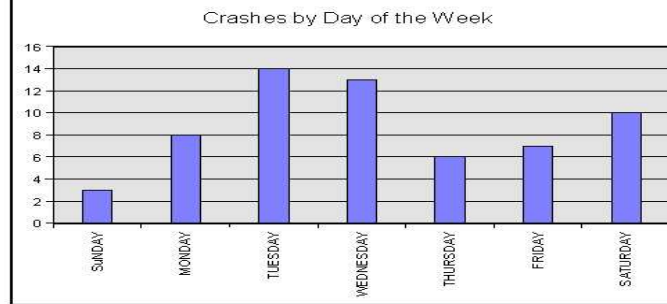
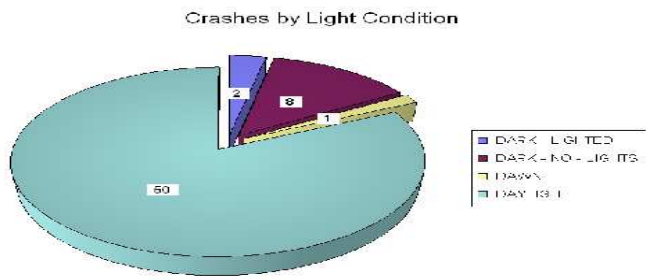
WZ 3 Month  
Crash Total = 55  
(Big Problem)

FRA-SR-161 Count of Crashes in Work Zone by Month



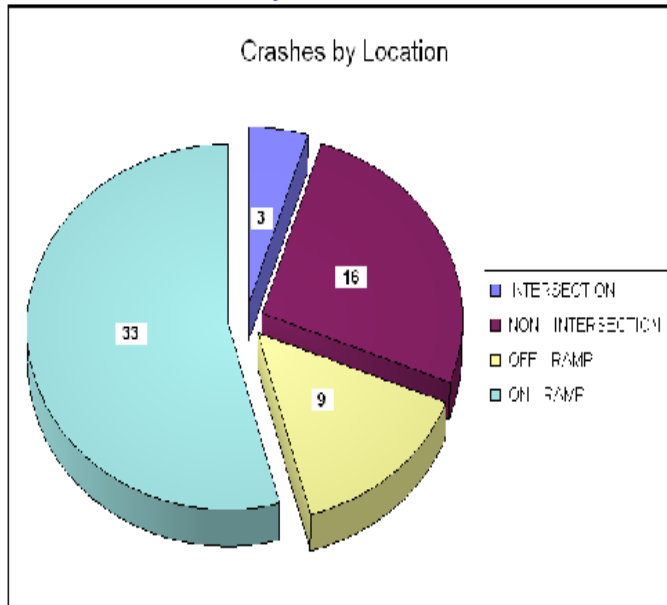
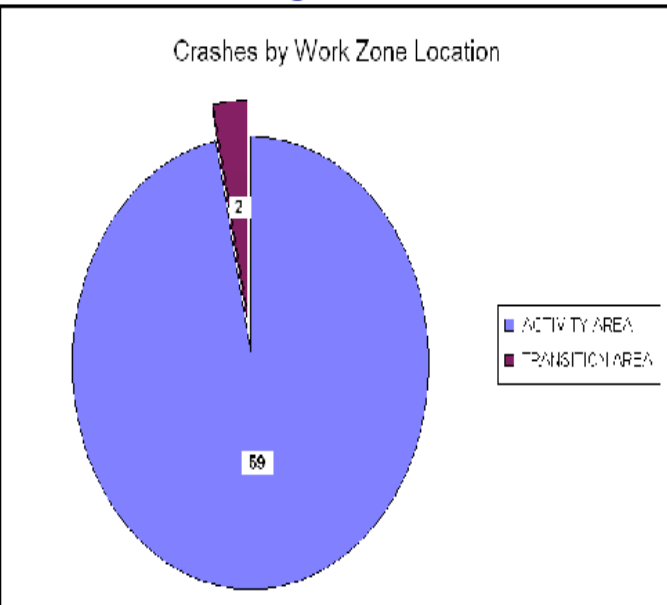
FRA-SR-161 Work Zone vs. Non Work Zone



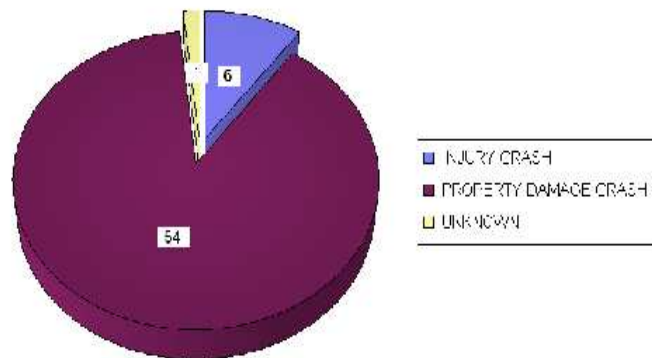


### FRA-SR-161 (Log 15.2-17.2)

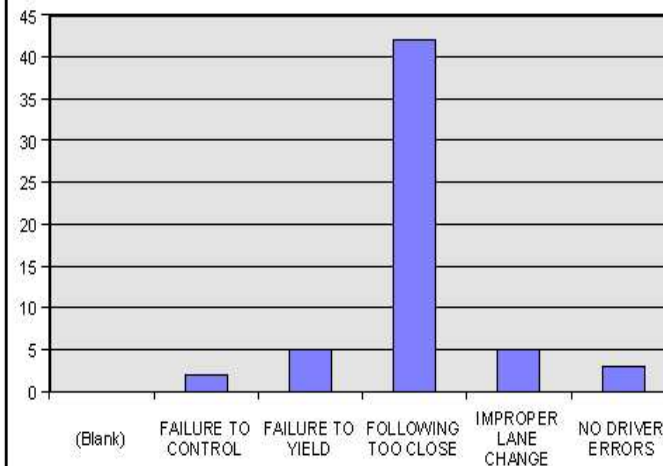
### Work Zone Crash Analysis



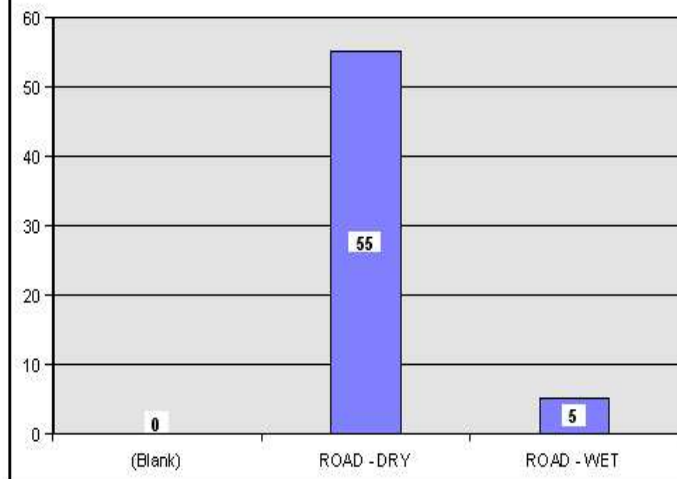
Crashes by Severity



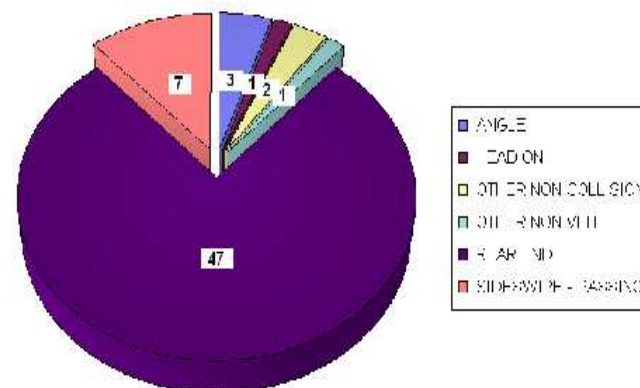
Crashes by Contributing Factor



Crashes by Road Condition



Crashes by Type of Crash



# MOT OPI (Organizational Performance Index)

## **630.1008 State Level Processes and Procedures**

- Data – “SHALL use field observations, wz crash data, operational information to manage....”
- Data – “SHALL continually pursue improvement of wz safety and mobility by analyzing work zone crash and operational data from multiple projects.....”



# MOT OPI (Organizational Performance Index)

**Every Interstate and look-alike work zone is inspected and rated by Central Office for adherence to standards, specifications and for safety concerns**



# MOT OPI (Organizational Performance Index)

- Results of these inspections are part of Organization Performance Index (OPI)
- Any safety concerns are immediately brought to the attention of the district for correction
- Each District Deputy Director is held accountable for their OPI performance
- Standards revised as necessary to address common deficiencies.



# QUESTIONS??

